INDEX

Aleurites fordii— Page
fruit structure and pistillate flower, development. Lewis P. McCann 361-378
See also Tung.
Alfalfa plot, wireworms in, seasonal vertical distribution 129-130
ALFREDSON, B. V., and SYKES, J. F.: Electrocardiograph Studies in Normal Dairy Cattle 61-87
Alkaloid content of *Nicotiana* spp. and hybrids, determination and separation methods 348-351
Alkaloids in certain species and interspecific hybrids of *Nicotiana*. Harold H. Smith and Claude R. Smith 347-359
ALLISON, FRANKLIN E., HORNER, C. KENNETH, BURK, DEAN, and SHERMAN, MILDRED S.: Nitrogen Fixation by *Azotobacter* as Influenced by Molybdenum and Vanadium 173-193
Alternara solani—
cause of collar rot of tomatoes 339
resistance in tomatoes 339-346
Anabasine—
content of *Nicotiana* spp. and hybrids 348-358
use as insecticide 356-357
ANDREWS, JOHN S.: Stomach Worm (*Haemonchus contortus*) Infection in Lambs and Its Relation to Gastric Hemorrhage and General Pathology 1-18
ANDRUS, C. F., REYNARD, G. B., JORGENSEN, HANS, and EADES, JACK: Collar Rot Resistance in Tomatoes 339-346
Aphids, transmission of virus causing narcissus mosaic, experiments 413-418
Apple—
leafhoppers, feeding, effects on photosynthesis and transpiration of apple leaves 267-276
leaves—
photosynthesis, apparent, effects of leafhopper feeding injury. G. Edward Marshall, N. F. Childers, and Howard W. Brody 265-287
structure, internal, effects of feeding of leafhoppers 277-280
transpiration, effects of leafhopper feeding injury on. G. Edward Marshall, N. F. Childers, and Howard W. Brody 265-281
roots, infection with *Xylaria mali*, development and effects 300-310
seedling clones, susceptibility to attack by *Xylaria mali* 304-308, 310
seedlings, wounding, effect on infection with *Xylaria mali* 301
trees—
age, effect on susceptibility to black root rot 309-310
black root rot, distribution and severity, factors affecting. J. S. Cooley 299-311
susceptibility to *Xylaria mali*, comparison with pear, plum, cherry, and peach trees 303-304, 310
varieties—
own-rooted, susceptibility to attack by *Xylaria mali* 304-308
standard seedlings, susceptibility to attack by *Xylaria mali* 304-308
Apples—
enzyme activity, relation to respiration 456-460
growing season, rate of respiration and enzyme activity during 456-458
Jonathan, respiration and enzyme activity, seasonal differences 458-460
maturity—
effect on respiratory and enzyme activity in storage 460-461
respiration and oxidase and catalase activity in relation to. Boyce D. Ezell and Fisk Gerhardt 453-471
Apples—Continued. Page
respiration rate after harvest 454-456
storage, respiration and oxidase and catalase activity in relation to. Boyce D. Ezell and Fisk Gerhardt 453-471
Awn inheritance in barley. James L. Myler 405-412
Azotobacter—
chroococcum, nitrogen fixation, effect of molybdenum and vanadium, experiments 175-191
culture media—
age, effect on nitrogen fixation 176-178
modification and purification 179-181
nitrogen fixation, influence of molybdenum and vanadium. C. Kenneth Horner, Dean Burk, Franklin E. Allison, and Mildred S. Sherman 173-193
spp., strain variation, nitrogen-fixation studies 181-183
vinelandii, nitrogen fixation, effect of molybdenum and vanadium, experiments 175-191

Bacterial wilt, resistance of tobacco. Edward E. Clayton and Thomas E. Smith 547-554
Bacterium solanacearum—
cause of bacterial wilt of tobacco 547
resistance of tobacco to. Edward E. Clayton and Thomas E. Smith 547-554
Bang's disease, "ceased" reactors, response to reexposure. B. A. Beach, M. R. Irwin, and L. C. Ferguson 523-532
Barley—
awn inheritance. James L. Myler 405-412
hybrids—
awned×awnless, awn segregation 407-410
hooded×awnless, segregation of characters 410-412
BEACH, B. A., IRWIN, M. R., and FERGUSON, L. C.: The Response of "Ceased" Reactors in Bang's Disease to Reexposure 523-532
BEASLEY, J. O., and BROWN, META SUCHE: Asynaptic *Gossypium* Plants and Their Polyploids 421-427
Beets, Mendelian characters and linkages 155-171
Begonia, fibrous-rooted, pythium disease—
and its control. John T. Middleton, C. M. Tucker, and C. M. Tompkins 89-95
causal fungi 90-93
symptoms 89-90
Beta vulgaris—
albinism, cytoplasmic inheritance 169-170
black root, linkage relationships, studies 156, 161-170
bolting, linkage relationships, studies 156, 161
colored leaf, linkage relationships, studies 156-158, 161-170
linkage group 161-166
linkages and deviations not in linkage groups 166-168
Mendelian characters and linkages observed in Y-R-B group. F. V. Owen and George K. Ryser 155-171
pigment development, inheritance studies 156-170
vigor and plant weight, effect of respective genes 168-169
Black root rot of apple trees, distribution and severity, factors affecting. J. S. Cooley 299-311
Blackberry, infection with mild forms of mosaic, effects 196, 204-205
BLANTON, F. S., and HAASIS, F. A.: Insect Transmission of the Virus Causing Narcissus Mosaic 413-419
Blueberry, Cabot—
dry weight, effect of nutrients and media 324-325
fresh weight, effect of nutrients and media 321-324
growth, effect of nutrients, media, and growth substances 313-327
mineral deficiency, symptoms 315-320
terminal growing points, abortion, effect of nutrients 325

Page

Boron, effect on growth of Cabot blueberry plants ... 313-327
BOTTGER, G. T.:
Development of Synthetic Food Media for Use in Nutrition Studies of the European Corn Borer ... 493-500
PATCH, L. H., STILL, G. W., and SCHLOSBERG, M.: Factors Determining the Reduction in Yield of Field Corn by the European Corn Borer ... 473-482
BRODY, HOWARD W., MARSHALL, G. EDWARD, and CHILDERS, N. F.: The Effects of Leafhopper Feeding Injury on Apparent Photosynthesis and Transpiration of Apple Leaves ... 265-281
BROWN, META SUCHE, and BEASLEY, J. O.: Asynaptic *Gossypium* Plants and Their Polyploids ... 421-427
Brucella abortus, "ceased" reactors to response to reexposure ... 523-531
Bunostomum trigonocephalum, survival in sheep pastures, experiments ... 332-335
BURK, DEAN, HORNER, C. KENNETH, ALLISON, FRANKLIN E., and SHERMAN, MILDRED S.: Nitrogen Fixation by *Azotobacter* as Influenced by Molybdenum and Vanadium ... 173-193

Cabbage yellows pathogen, inoculation in tomato and pea ... 240-241, 243, 244, 245
Calcium—
content of Shelby loam, factors affecting ... 288, 291, 296
effect on growth of Cabot blueberry plants ... 313-326
California, canker of true firs caused by *Cytospora abietis*. Ernest Wright ... 143-153
Calves, hydrocephalus, study ... 484-490
Canker of true firs, caused by *Cytospora abietis* in California and Nevada. Ernest Wright ... 143-153
CARLETON, E. A., and SLATER, C. S.: Variability of Eroded Material ... 209-219
Catalase—
active and inactive, production by *Proteus vulgaris*. T. L. Swenson and Harry Humfeld ... 391-403
activity of apples, relation to maturity and storage. Boyce D. Ezell and Fisk Gerhardt ... 453-471
cell-free, active and activable, effect of centrifuging ... 400
production and activation in *Proteus vulgaris*, effect of cell destruction ... 399-400
Cattle—
Bang's disease, "ceased" reactors, response to reexposure ... 523-531
dairy—
electrocardiograph studies—
experimental procedure ... 62-84
results and discussion ... 64-84
heart rate, factors affecting, studies ... 64-85
normal, electrocardiograph studies. B. V. Alfredson and J. F. Sykes ... 61-87
hydrocephalus, lethal, in. C. L. Cole and L. A. Moore ... 483-491
Chabertia ovina, survival in sheep pastures, experiments ... 332-335
Cherry trees, susceptibility to *Xylaria mali*, comparison with apple ... 303-304, 310
CHILDERS, N. F., MARSHALL, G. EDWARD, and BRODY, HOWARD W.: The Effects of Leafhopper Feeding Injury on Apparent Photosynthesis and Transpiration of Apple Leaves ... 265-281
Chromosome pairing in *Gossypium* hybrids, study ... 421-427
CLAYTON, EDWARD E., and SMITH, THOMAS E.: Resistance of Tobacco to Bacterial Wilt (*Bacterium solanacearum*) ... 547-554
Cold resistance in wheat hybrids, inheritance and interrelationship with components of quality and morphological characters. W. W. Worzella ... 501-522
COLE, C. L., and MOORE, L. A.: Hydrocephalus, a Lethal in Cattle ... 483-491
Collar rot resistance in tomatoes. C. F. Andrus, G. B. Reynard, Hans Jorgensen, and Jack Eades ... 339-346
COMSTOCK, R. E., WINTERS, L. M., JORDAN, P. S., and KISER, O. M.: Measures of Growth Rate for Use in Swine Selection ... 379-389

Page

COOLEY, J. S.: Factors Affecting Distribution and Severity of Black Root Rot of Apple Trees ... 299-311
Cooperia curticei, survival in sheep pastures, experiments ... 332-335
Corn—
borer, European—
damage to field corn, factors affecting, experiments ... 473-482
larval development, effect of synthetic food, studies ... 497-499
metamorphosis and reproduction, effects of synthetic food ... 499
nutrition studies, results ... 496-499
nutrition, study methods, material, and equipment ... 493-496
nutrition, synthetic food media for use in studies. G. T. Bottger ... 493-500
population, relation to corn yields ... 474
reduction in yield of field corn, factors determining. L. H. Patch, G. W. Still, M. Schlosberg, and G. T. Bottger ... 473-482
field, yield reduction by European corn borer, factors determining. L. H. Patch, G. W. Still, M. Schlosberg, and G. T. Bottger ... 473-482
plant, development stage, effect on damage by borer ... 479-480
plot, wireworms in, seasonal vertical distribution ... 133-134
strain, effect on damage of corn by borer ... 480-482
yield, level, effect on yield reduction per borer ... 475-478
yields—
in western Iowa, influence of distribution of rainfall and temperature. E. E. Houseman and F. E. Davis ... 533-545
relation to weather in western Iowa, investigations ... 535-544
Cotton plants, asynaptic, and their polyploids ... 421-427
Cow, udder, suspension tissue, arrangement. W. W. Swett, P. C. Underwood, C. A. Matthews, and R. R. Graves ... 19-43
Cows, "ceased" reactors in Bang's disease, response to reexposure ... 623-631
Crown gall infection of tomato, micrurgical study. E. M. Hildebrand ... 45-59
Cytospora abietis—
cause of canker of true firs in California and Nevada. Ernest Wright ... 143-153
cross inoculations on white and red fir ... 148-149
identity and isolation ... 146
infection of firs, factors predisposing ... 149-152
on white firs, pathogenicity tests ... 147-149
Cytospora canker on—
red fir, extent ... 145-146
white fir, extent ... 144-145

DAVIS, F. E., and HOUSEMAN, E. E.: Influence of Distribution of Rainfall and Temperature on Corn Yields in Western Iowa ... 533-545

EADES, JACK, ANDRUS, C. F., REYNARD, G. B., and JORGENSEN, HANS: Collar Rot Resistance in Tomatoes ... 339-346
Electrocardiogram, bovine—
deflections—
form and occurence ... 71-78
potential ... 78-80
variations in successive tracings ... 80-82
intervals ... 65-70
Electrocardiograph studies in normal dairy cattle. B. V. Alfredson and J. F. Sykes ... 61-87
Empoasca fabae, feeding on apple leaves, effects on photosynthesis and transpiration ... 276-277, 279
Environment, controlled, influence on resistance of garden pea to fusarium wilt. Wilbur T. Schroeder and J. C. Walker ... 221-248
Enzyme activity of apples, relation to maturity and storage ... 453-470
Eroded materials, variability. C. S. Slater and E. A. Carlton ... 209-219
Erosion—
effect on fertility changes in Shelby loam profile. D. M. Whitt and C. L. W. Swanson ... 283-298
soil losses, organic-matter content ... 209-218

Page

Erythroneura—
feeding on apple leaves, effect on photosynthesis and transpiration 267–276
spp., population in apple orchard, estimation 267
EZELL, BOYCE D., and GERHARDT, FISK: Respiration and Oxidase and Catalase Activity of Apples in Relation to Maturity and Storage 453–471

Fallow plots, wireworms in, seasonal vertical distribution 128–129, 134–135
Farrowing, season and year, influence on weight of pig at 180 days 252–253
FERGUSON, L. C., BEACH, B. A., and IRWIN, M. R.: The Response of "Ceased" Reactors in Bang's Disease to Reexposure 523–532
Fertility changes in Shelby loam profile, effect of erosion on. D. M. Whitt and C. L. W. Swanson 283–298
Field plots, wireworms in, vertical distribution, comparison 136–137
Fir—
red, canker caused by *Cytospora abietis* 145–146
white, canker caused by *Cytospora abietis* 144–145
Firs—
infection by *Cytospora abietis*, factors predisposing 149–152
true, canker, caused by *Cytospora abietis* in California and Nevada. Ernest Wright 143–153
white, *Cytospora abietis* infection, pathogenicity, tests 147–149
Food media, synthetic, development for use in nutrition studies of European corn borer. G. T. Bottger 493–500
Fruit trees, susceptibility to *Xylaria mali*, comparison 303–304, 310
Fusarium—
oxysporum—
f. *pisi* race 1, growth in pea plant, relation to temperature 229–230
strains, host specificity, cross-inoculation study 240–241, 243, 244, 245
relation to host pea plant, influence of sand temperature 230–233, 243
wilt—
development, relation to increased pea-nutrient concentration 233–238, 242, 243
resistance of garden pea to, influence of controlled environment and nutrition on. Wilbur T. Schroeder and J. C. Walker 221–248

Gastric hemorrhage in lambs, relation to stomach worm infection. John S. Andrews 1–18
GERHARDT, FISK, and EZELL, BOYCE D.: Respiration and Oxidase and Catalase Activity of Apples in Relation to Maturity and Storage 453–471
Gossypium—
hirsutum × *G. barbadense*, chromosome pairing, study 421–427
plants, asynaptic—
and their polyploids. J. O. Beasley and Meta Suche Brown 421–427
genetics 424–425
GRAVES, R. R., SWETT, W. W., UNDERWOOD, P. C., and MATTHEWS, C. A.: Arrangement of the Tissues by Which the Cow's Udder Is Suspended 19–43
Groundcherry, infection with mild forms of mosaic, effects 196, 204–205

HAASIS, F. A., and BLANTON, F. S.: Insect Transmission of the Virus Causing Narcissus Mosaic 413–419
Haemonchus contortus—
infection in lambs, relation to gastric hemorrhage, and general pathology. John S. Andrews 1–18
survival in sheep pastures, experiments 329–335
Heart—
bovine, systolic index 69–70
rate, in dairy breeds, cardiograph readings 64–85
Hemorrhage, gastric, in lambs, relation to stomach worm infection. John S. Andrews 1–18

Page

Heredity, influence on 180-day weight in Poland China swine. J. A. Whatley, Jr. 249–263
Hevea—
brasiliensis seedling division—
Gambar method, tests 97–98, 105–121, 124
Ramaer method, tests 98–105, 124
seedlings—
older, splitting methods 121–123
splitting, methods. H. F. Loomis 97–124
HILDEBRAND, E. M.: A Micrurgical Study of Crown Gall Infection in Tomato 45–59
HOLTON, C. S.: Extent of Pathogenicity of Hybrids of *Tilletia tritici* and *T. levis* 555–563
HORNER, C. KENNETH, BURK, DEAN, ALLISON, FRANKLIN E., and SHERMAN, MILDRED S.: Nitrogen Fixation by *Azotobacter* as Influenced by Molybdenum and Vanadium 173–193
HOUSEMAN, E. E., and DAVIS, F. E.: Influence of Distribution of Rainfall and Temperature on Corn Yields in Western Iowa 533–545
HUMFELD, HARRY, and SWENSON, T. L.: Production of Active and Inactive Catalase by *Proteus vulgaris* 391–403
Hydrocephalus—
lethal in cattle. C. L. Cole and L. A. Moore 483–491
symptoms in calves 485–489
Hydrogen peroxide—
decomposition by bacteria, past research 392–394
use in catalase determinations 396

Inheritance—
albinism in beets 169–170
awns in barley. James L. Myler 405–412
in wheat hybrids, and interrelationship of components of quality, cold resistance and morphological characters. W. W. Worzella 501–522
pathogenicity in *Tilletia* hybrids, experiments 555–563
Insect transmission of virus causing narcissus mosaic. F. S. Blanton and F. A. Haasis 413–419
Insecticides, source in *Nicotiana* spp. and hybrids 355–357
Iowa, western—
corn yields in, influence of distribution of rainfall and temperature on. E. E. Houseman and F. E. Davis 533–545
rainfall analysis 535–538
temperature analysis 538–544
Iron—
effect on growth of Cabot blueberry plants 313–327
relation to molybdenum effect on nitrogen fixation by *Azotobacter* 185–187
IRWIN, M. R., BEACH, B. A., and FERGUSON, L. C.: The Response of "Ceased" Reactors in Bang's Disease to Reexposure 523–532

JONES, E. W., and SHIRCK, F. H.: The Seasonal Vertical Distribution of Wireworms in the Soil in Relation to Their Control in the Pacific Northwest 125–142
JORDAN, P. S., COMSTOCK, R. E., WINTERS, L. M., and KISER, O. M.: Measures of Growth Rate for Use in Swine Selection 379–389
JORGENSEN, HANS, ANDRUS, C. F., REYNARD, G. B., and EADES, JACK: Collar Rot Resistance in Tomatoes 339–346

KISER, O. M., COMSTOCK, R. E., WINTERS, L. M., and JORDAN, P. S.: Measures of Growth Rate for Use in Swine Selection 379–389
KRAMER, AMIHUD, and SCHRADER, A. L.: Effect of Nutrients, Media, and Growth Substances on the Growth of the Cabot Variety of *Vaccinium corymbosum* 313–328

Lambs—
dying from infection by stomach worms, blood picture 6–12
feces, recovery of stomach worms, blood, and eggs from 4–5
feeding low-nitrogen rations, influences, experiments 430–449
infected by stomach worms—
pathological findings 15–16
reticulocyte counts 13–14
white cell-counts, total and differential 14–15

Page

Lambs—Continued.
nematodes, survival in pastures 329-336
nitrogen retention, effect of feeding low-nitrogen ration 443-446
protein utilization 447-448
proteins, biological values, determination 448
recovery from stomach worm infection 5-6
stomach worm infection and its relation to gastric hemorrhage and general pathology. John S. Andrews 1-18
See also Sheep.
Leafhopper feeding injury, effects on apparent photosynthesis and transpiration of apple leaves. G. Edward Marshall, N. F. Childers, and Howard W. Brody 265-281
Lemonius spp., seasonal distribution in soil, relation to control in Pacific Northwest 126-142
Loomis, H. F.: Methods of Splitting Hevea Seedlings 97-124

Macrosiphum spp., transmission of virus causing narcissus mosaic, experiments 413-418
Magnesium—
content of Shelby loam, factors affecting 288
effect on growth of Cabot blueberry plants 313-327
Manganese, effect on growth of Cabot blueberry plants 313-327
Mangels, Mendelian characters and linkages 155-171
Marshall, G. Edward, Childers, N. F., and Brody, Howard W.: The Effects of Leafhopper Feeding Injury on Apparent Photosynthesis and Transpiration of Apple Leaves 265-281
Materials, eroded, variability. C. S. Slater and E. A. Carleton 209-219
Matthews, C. A., Swett, W. W., Underwood, P. C., and Graves, R. R.: Arrangement of the Tissues by Which the Cow's Udder Is Suspended 19-43
McCann, Lewis, P.: Development of the Pistillate Flower and Structure of the Fruit of Tung (*Aleurites fordii*) 361-378
Mendelian characters in *Beta vulgaris* and linkages observed in the Y-R-B group. F. V. Owen and George K. Ryser 155-171
Middleton, John T., Tucker, C. M., and Tompkins, C. M.: Pythium Disease of Fibrous-Rooted Begonia and Its Control 89-95
Miller, J. I., and Morrison, F. B.: The Influence of Feeding Low-Nitrogen Rations on the Reliability of Biological Values 429-451
Mineral deficiency in growth substance, effect on Cabot blueberry 313-327
Mites, transmission of virus causing narcissus mosaic, experiments 413-418
Molybdenum—
in nitrogen fixation, effective concentration range 183-185
influence on nitrogen fixation by *Azotobacter*. C. Kenneth Horner, Dean Burk, Franklin E. Allison, and Mildred S. Sherman 173-193
Moore, L. A., and Cole, C. L.: Hydrocephalus, a Lethal in Cattle 483-491
Morrison, F. B., and Miller, J. I.: The Influence of Feeding Low-Nitrogen Rations on the Reliability of Biological Values 429-451
Mosaic—
mild forms, effects on potato and on other plants. Winona E. Stone 195-207
narcissus, virus causing, transmission by insects. F. S. Blanton and F. A. Haasis 413-419
Myler, James L.: Awn Inheritance in Barley 405-412

Narcissus mosaic, virus causing, transmission by insects. F. S. Blanton and F. A. Haasis 413-419
Nematodes, sheep, survival in pastures. Doys A. Shorb 329-337
Nematodirus spp., survival in sheep pastures, experiments 332-336
Nevada, canker of true firs caused by *Cytospora abietis*. Ernest Wright 143-153

Page

Nicotiana—
hybrids, interspecific, and alkaloids—Harold H. Smith and Claude R. Smith 347-356
list 352
spp.—
alkaloids in. Harold H. Smith and Claude R. Smith 347-359
and hybrids, alkaloid content—determination and separation methods 348-351
economic possibilities 355-357
genetic discussion 353-355
resistance to bacterial wilt, tests 548-553
wild, alkaloid content, study 347-358
wild, alkaloids of, list 351
tabacum, resistance to bacterial wilt, tests 550-551
Nicotine—
content of *Nicotiana* spp. and hybrids 347-358
use as insecticide, new sources 355-356
Nitrogen—
effect on growth of Cabot blueberry plants 313-325
fixation by *Azotobacter*—
as influenced by molybdenum and vanadium. C. Kenneth Horner, Dean Burk, Franklin E. Allison, and Mildred S. Sherman 173-193
relation of iron and other elements to, studies 185-190
low, rations, feeding, influence on reliability of biological values. J. I. Miller and F. B. Morrison 429-451
retention by lambs, effect of feeding low-nitrogen ration 443-446
utilization by lambs, effect of low-nitrogen rations 448
Nornicotine—
content of *Nicotiana* spp. and hybrids 347-358
use as insecticide 357
Nutrients, effect on growth of Cabot variety of *Vaccinium corymbosum*. Amihud Kramer and A. L. Schrader 313-328
Nutrition—
European corn borer, development of synthetic food media for use in studies. G. T. Bottger 493-500
garden pea, influence on resistance to fusarium wilt. Wilbur T. Schroeder and J. C. Walker 221-248

Ontario loam, eroded material, variability 210-218
Ostertagia spp., survival in sheep pastures, experiments 332-336
Owen, F. V., and Ryser, George K.: Some Mendelian Characters in *Beta vulgaris* and Linkages Observed in the Y-R-B Group 155-171
Oxidase activity of apples, relation to maturity and storage. Boyce D. Ezell and Fisk Gerhardt 453-471
Oxygen, effects on catalase production by *Proteus vulgaris* 398-399, 400-401

Pacific Northwest, wireworms, seasonal vertical distribution in soil, relation to their control. E. W. Jones and F. H. Shirck 125-142
Pastures—
fall and winter, survival of nematodes on, experiments 334-335
sheep nematodes, survival. Doys A. Shorb 329-337
spring, survival of nematodes on, experiments 335
summer, survival of nematodes on, experiments 331-334
Patch, L. H., Still, G. W., Schlosberg, M., and Bottger, G. T.: Factors Determining the Reduction in Yield of Field Corn by the European Corn Borer 473-482
Pea—
garden, resistance to fusarium wilt, influence of controlled environment and nutrition on. Wilbur T. Schroeder and J. C. Walker 221-248
nutrient concentration, increase, relation to development of fusarium wilt 233-238, 242, 243
plants, pathological anatomy in study of fusarium wilt 238-240, 243, 244

Page

Pea—Continued.
wilt—
development, influence of air temperature 229
development, influence of soil temperature 225–226, 242–243
environal studies 224–233
in resistant plants, influence of temperature 226–229, 244
pathogen, inoculation in cabbage and tomato 240–241, 243, 244, 245
symptoms and disease criteria 223–224, 244
Peach trees, susceptibility to attack by *Xylaria mali*, comparison with apple 303–304, 310
Pear trees, susceptibility to attack by *Xylaria mali*, comparison with apple 303–304, 310
Peat—
effect on growth of Cabot blueberry, experiments 313–327
growth substances, effect on growth of blueberry, experiments 320–321
Phosphorus, effect on growth of Cabot blueberry plants 313–325
Photosynthesis, apparent, of apple leaves, effects of leafhopper feeding injury on. G. Edward Marshall, N. F. Childers, and Howard W. Brody 265–281
Phytomonas tumefaciens, infection in tomato, micrurgical study 45–58
Pigment development in *Beta vulgaris*, inheritance studies 156–170
Pigs—
growth—
during different parts of growing period, heritability 386, 387, 388
up to 56 days of age 379–383
Poland China, weight at 180 days, influence of heredity and other factors 249–263
postweaning growth rate, measurement 383–385
sex, influence on weight at 180 days 253
weight at 180 days—
correlations 259–262, 263
influence of—
birth weight and weaning weight 253–254
dam's age 253
inbreeding 251–252
season and year of farrowing 252–253
sex 253
variance, regression on genetic relationship between pigs 254–257, 263
See also Swine.
Plants, asynaptic—
meiotic chromosome behavior 421–424
polyploids, meiotic chromosome behavior 421–424
Plum trees, susceptibility to attack by *Xylaria mali*, comparison with apple 303–304, 310
Polyploids of asynaptic *Gossypium* plants. J. O. Beasley and Meta Suche Brown 421–427
Potassium, effect on growth of Cabot blueberry plants 313–326
Potato—
leaf, chloroplasts, size and number, effects of mosaic virus infection 198–201
leafhopper, feeding on apple leaves, effects on photosynthesis and transpiration 276–277, 279
mosaic—
effect on—
carbohydrate fixation by chloroplasts 201–202
leaf measurements 197–198
size and number of chloroplasts 198–201
size of nucleus in cells of leaves 203
mild forms, effects. Winona E. Stone 195–207
plot, wireworms in, seasonal vertical distribution 130–133
Protein utilization by lambs 447–448
Proteins, biological values for lambs, determination 448
Proteus vulgaris—
catalase determinations, procedure 394–396
catalase production, effect of oxygen 398–399, 400–401
cell destruction, effect on catalase production and activation 399–400
population and catalase activity at various time intervals, comparison 397–398
production of active and inactive catalase. T. L. Swenson and Harry Humfeld 391–403
viable cells, effect of oxygen on number 398–399

Page

Pythium—
debaryanum, cause of disease of fibrous-rooted begonia, inoculation studies 92–93
disease of fibrous-rooted begonia and its control. John T. Middleton, C. M. Tucker, and C. M. Tompkins 89–95
spp., isolation from begonia and inoculation studies 91–93
splendens, cause of pythium disease of fibrous-rooted begonia, inoculation studies 92–93
ultimum—
cause of pythium disease of fibrous-rooted begonia 90–93
experimental host range 93–94

Rainfall, distribution, influence on corn yields in western Iowa. E. E. Houseman and F. E. Davis 533–545
Raspberry, infection with mild forms of mosaic, effects 196, 204–205
Rations, low-nitrogen, feeding, influence on reliability of biological values. J. I. Miller and F. B. Morrison 429–451
Respiration of apples, relation to maturity and storage. Boyce D. Ezell and Fisk Gerhardt 453–471
REYNARD, G. B., ANDRUS, C. F., JORGENSEN, HANS, and EADES, JACK: Collar Rot Resistance in Tomatoes 339–346
Root rot, black, of apple trees, distribution and severity, factors affecting. J. S. Cooley 299–311
Rubbertree, Pará, seedling division, methods 97–124
RYSER, GEORGE K., and OWEN, F. V.: Some Mendelian Characters in *Beta vulgaris* and Linkages Observed in the Y–R–B Group 155–171

Sand, value in growing blueberries, comparison with peat on sand 313–327
SCHLOSBERG, M., PATCH, L. H., STILL, G. W., and BOTTGER, G. T.: Factors Determining the Reduction in Yield of Field Corn by the European Corn Borer 473–482
SCHRADER, A. L., and KRAMER, AMIHUD: Effect of Nutrients, Media, and Growth Substances on the Growth of the Cabot Variety of *Vaccinium corymbosum* 313–328
SCHROEDER, WILBUR T., and WALKER, J. C.: Influence of Controlled Environment and Nutrition on the Resistance of Garden Pea to Fusarium Wilt 221–248
Sheep—
nematodes, survival in pastures. Doys A. Shorb 329–337
stomach worm infection and its relation to gastric hemorrhage and general pathology 1–17
See also Lambs.
Shelby loam—
eroded, profile characteristics 290–292
exchangeable calcium and magnesium content, factors affecting 288, 291, 295, 296
organic matter and nitrogen content, factors affecting 288–290, 292, 295
pH values of strata 288
profile, fertility changes, erosion effects on. D. M. White and C. L. W. Swanson 283–298
total exchange capacity, factors affecting 288, 291
Shelby silt loam, noneroded, profile characteristics 285–288
SHERMAN, MILDRED S., HORNER, C. KENNETH, BURK, DEAN, and ALLISON, FRANKLIN E.: Nitrogen Fixation by *Azotobacter* as Influenced by] Molybdenum and Vanadium 173–193
SHIRCK, F. H., and JONES, E. W.: The Seasonal Vertical Distribution of Wireworms in the Soil in Relation to Their Control in the Pacific Northwest 125–142
SHORB, DOYS A.: Survival of Sheep Nematodes in Pastures 329–337
SLATER, C. S., and CARLETON, E. A.: Variability of Eroded Material 209–219
SMITH, CLAUDE R., and SMITH, HAROLD H.: Alkaloids in Certain Species and Interspecific Hybrids of *Nicotiana* 347–359

Page

SMITH, HAROLD H., and SMITH, CLAUDE R.: Alkaloids in Certain Species and Interspecific Hybrids of *Nicotiana* ... 347-359
SMITH, THOMAS E., and CLAYTON, EDWARD E.: Resistance of Tobacco to Bacterial Wilt (*Bacterium solanacearum*) ... 547-554
Soil—
fertility, effect on damage of corn by borers ... 478-479
losses from erosion, studies ... 209-218
material, eroded—
analysis ... 210-214
sources of organic matter ... 214-216
temperature, effect on development of pea wilt in susceptible plants ... 225-226
type, effect on damage of corn by borers ... 479
wireworms in, seasonal vertical distribution, relation to their control in Pacific Northwest. E. W. Jones and F. H. Shirck ... 125-142
Soil Conservation Experiment Station, Bethany, Mo., soil-fertility studies in relation to erosion ... 283-297
Soils—
eroded material, variability. C. S. Slater and E. A. Carleton ... 209-219
fertility changes, relation to erosion, studies ... 283-297
plot, and material eroded, analysis ... 210-214
Spinach plot, wireworms in, seasonal vertical distribution ... 127-128
STILL, G. W., PATCH, L. H., SCHLOSBERG, M., and BOTTGER, G. T.: Factors Determining the Reduction in Yield of Field Corn by the European Corn Borer ... 473-482
Stomach worm (*Haemonchus contortus*) infection in lambs and its relation to gastric hemorrhage and general pathology. John S. Andrews ... 1-18
STONE, WINONA E.: Effects of Some Mild Forms of Mosaic on Potato and a Few Other Plants ... 195-207
Sugar beets, Mendelian characters and linkages ... 155-171
Sulfur, effect on growth of Cabot blueberry plants ... 313-326
SWANSON, C. L. W., and WHITT, D. M.: Effect of Erosion on Fertility Changes in the Shelby Loam Profile ... 283-298
SWENSON, T. L., and HUMFELD, HARRY: Production of Active and Inactive Catalase by *Proteus vulgaris* ... 391-403
SWETT, W. W., UNDERWOOD, P. C., MATTHEWS, C. A., and GRAVES, R. R.: Arrangement of the Tissues by Which the Cow's Udder Is Suspended ... 19-43
Swine—
growth rate, measures, use in selection. R. E. Comstock, L. M. Winters, P. S. Jordan, and O. M. Kiser ... 379-389
inbreeding, influence on weight of pigs at 180 days ... 251-252
Minn. No. 1 strain, growth studies ... 379-388
Poland China, 180-day weight, influence of heredity and other factors on. J. A. Whatley, Jr. ... 249-263
selection, use of measures of growth rate. R. E. Comstock, L. M. Winters, P. S. Jordan, and O. M. Kiser ... 379-389
See also Pigs.
SYKES, J. F., and ALFREDSON, B. V.: Electrocardiograph Studies in Normal Dairy Cattle ... 61-87

Temperature—
influence on—
corn yields in western Iowa. E. E. Houseman and F. E. Davis ... 533-545
development of pea wilt ... 229
infection of apple roots by *Xylaria mali* ... 302, 308
pea wilt in resistant plants ... 226-229, 244
rate of activation of catalase ... 399, 401
relation to growth of fusarium in pea plants ... 229-230
sand, influence on—
development of pea wilt ... 225-226
host-parasite relationship of pea plant and fusarium ... 230-233, 243
soil, effect on development of pea wilt in susceptible plants ... 225-226

Page

Thrips, transmission of virus causing narcissus mosaic, experiments ... 413-415
Tilletia—
levis and *T. tritici* hybrids, pathogenicity, extent. C. S. Holton ... 555-563
race hybrids, pathogenicity studies ... 559-560
spp.—
backcrosses, pathogenicity studies ... 560-561
hybrids, pathogenicity studies ... 556-559
tritici and *T. levis* hybrids, pathogenicity, extent. C. S. Holton ... 555-563
Tissues, cow's udder, arrangement for suspension. W. W. Swett, P. C. Underwood, C. A. Matthews, and R. R. Graves ... 19-43
Tobacco—
resistance to bacterial wilt (*Bacterium solanacearum*). Edward E. Clayton and Thomas E. Smith ... 547-554
strains resistant to bacterial wilt, description and degree of resistance ... 551-553
T. I. 448A, resistance to bacterial wilt, and characteristics ... 552-553
Tomato—
crown gall—
formation, smallest number of bacteria required; experiments ... 53-57
infection, micrurgical study. E. M. Hildebrand ... 45-59
infection, smallest size of wound required, experiments ... 49-53
wilt pathogen, inoculation in cabbage and pea ... 240-241, 243, 244, 245
Tomatoes—
collar rot—
control ... 346
symptoms and development ... 339
inoculation with collar rot organism ... 340-346
resistance to collar rot. C. F. Andrus, G. B. Reynard, Hans Jorgensen, and Jack Eades ... 339-346
varieties resistant to collar rot ... 341-346
TOMPKINS, C. M., MIDDLETON, JOHN T., and TUCKER, C. M.: Pythium Disease of Fibrous-Rooted Begonia and Its Control ... 89-95
Trace elements, relation to nitrogen fixation by *Azotobacter*, studies ... 187-190
Transpiration of apple leaves, effects of leafhopper feeding injury on. G. Edward Marshall, N. F. Childers, and Howard W. Brody ... 265-281
Trichostrongylus spp., survival in sheep pastures, experiments ... 332-336
Trichuris ovis, survival in sheep pastures, experiments ... 332-336
TUCKER, C. M., MIDDLETON, JOHN T., and TOMPKINS, C. M.: Pythium Disease of Fibrous-Rooted Begonia and Its Control ... 89-95
Tung—
embryo, growth ... 368-369
endosperm, growth, and structural filling of seeds ... 369-370
fruit—
bud differentiation ... 373-374
bud formation, studies ... 365-366
bud, resting and spring growth ... 366
enlargement and growth periods ... 366-367
growth periods, comparison with other fruits ... 374-375
mature, structure ... 370, 375-376
structure and pistillate flower, development. Lewis P. McCann ... 361-378
vascular anatomy ... 370-373, 375
pistillate—
buds, overwintering ... 374
flower and fruit structure, development. Lewis P. McCann ... 361-378
seed, structural development ... 367
tree—
flowering and fruiting, studies ... 363-376
inflorescence, types ... 363-365
terminal growth ... 363
Typhlocyba pomaria—
feeding on apple leaves, effect on transpiration ... 267-276
population in apple orchard, estimation ... 267

Udder, cow's, suspension tissues, arrangement. W. W. Swett, P. C. Underwood, C. A. Matthews, and R. R. Graves ... 19-43

Page

UNDERWOOD, P. C., SWETT, W. W., MATTHEWS, C. A., and GRAVES, R. R.: Arrangement of the Tissues by Which the Cow's Udder Is Suspended 19-43
United States Regional Swine Breeding Laboratory, Minneapolis, Minn., growth-rate data 379-388

Vaccinium corymbosum, Cabot variety, growth, effect of nutrients, media, and growth substances. Amihud Kramer and A. L. Schrader 313-328
Vanadium—
in nitrogen fixation, effective concentration range 183-185
influence on nitrogen fixation by *Azotobacter*. C. Kenneth Horner, Dean Burk, Franklin E. Allison, and Mildred S. Sherman 173-193
Virus causing narcissus mosaic, insect transmission. F. S. Blanton and F. A. Haasis 413-419

WALKER, J. C., and SCHROEDER, WILBUR T.: Influence of Controlled Environment and Nutrition on the Resistance of Garden Pea to Fusarium Wilt 221-248
Weather—
at Washington, D. C., records for 1938-39 331
effect on—
corn yields in western Iowa 535-544
damage to corn by borer 478
WHATLEY, J. A., JR.: Influence of Heredity and Other Factors on 180-Day Weight in Poland China Swine 249-263
Wheat—
bunt fungi, hybrids, pathogenicity studies. 555-563
Hussar × Hohenheimer, pathogenicity of *Tilletia* hybrids to 558-560, 562-563
hybrids—
carotenoid pigment content, inheritance. 508-510
characters, correlation and chi-square analysis 515-518
characters, inheritance 504-515
characters, interrelationship between ... 515-519
cold resistance, inheritance 513
components of quality, cold resistance, and morphological characters, inheritance and interrelationship. W. W. Worzella 501-522
crude protein, inheritance 510

Page

Wheat—Continued.
gluten strength, inheritance 504-506
granulation, inheritance 506-508
kernel weight, inheritance 511-512
linkage of gluten strength and glume color 518
linkage of protein content and kernel color 518-519
morphological characters, inheritance ... 513-514
morphological characters, quality and cold resistance, components of, inheritance and interrelationship. W. W. Worzella 501-522
quality components, interannual correlation coefficients 514-515
test weight, inheritance 512-513
winter hardiness, mode of inheritance ... 513
WHITT, D. M., and SWANSON, C. L. W.: Effect of Erosion on Fertility Changes in the Shelby Loam Profile 283-298
Wilt—
bacterial, resistance of tobacco to. Edward E. Clayton and Thomas E. Smith 547-554
fusarium, resistance of garden pea to, influence of controlled environment and nutrition. Wilbur T. Schroeder and J. C. Walker 221-248
Winter hardiness in wheat, mode of inheritance 513
WINTERS, L. M., COMSTOCK, R. E., JORDAN, P. S., and KISER, O. M.: Measures of Growth Rate for Use in Swine Selection .. 379-389
Wireworms, seasonal vertical distribution in soil, relation to their control in Pacific Northwest. E. W. Jones and F. H. Shirck 125-142
WORZELLA, W. W.: Inheritance and Interrelationship of Components of Quality, Cold Resistance, and Morphological Characters in Wheat Hybrids 501-522
WRIGHT, ERNEST: *Cytospora abietis*, the Cause of a Canker of True Firs in California and Nevada 143-153

Xylaria mali—
cause of black root rot of apple trees 299
growth and longevity in dead roots, determination 308-309
pathogenicity studies 303